



*Montana
Grazing Lands
Conservation
Initiative*

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*"Strengthening
partnerships
and encouraging
diversification
to maintain or
improve private
grazing land
resources through
grassroots efforts
and interagency
technical
assistance."*

Rangeland Monitoring

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This publication introduces some basic concepts of monitoring rangeland resources for land managers.

Why Monitor Rangeland?

- Healthy, vigorous, and productive rangelands are essential to the survival of the livestock industry and other users.
- Important changes in rangeland health usually occur gradually and oftentimes are too subtle to notice through casual observations. Also, human memory is imperfect and tends to fade with time.
- Rangeland health deteriorates before livestock production will indicate a problem. Livestock can compensate through preferential grazing to a point. By the time a reduction in livestock performance is noticed, it may take years for the rangeland to recover.
- Plan-Monitor-Replan. Monitoring is essential to determine if you are meeting your goals and objectives. It enables you to continually adjust your management strategies as needed.
- Monitoring can help you understand how much benefit you are getting from a change in grazing management, or from investments in range improvements.
- Monitoring will help you to learn more about range plants (your crop!) and how they interact with each other and with the grazing animals.
- Monitoring can instill a sense of pride and provide encouragement. It can build confidence and provide success stories that can be shared with others.

What Do I Monitor?

What you monitor depends on your goals and objectives. Ask the question, "What information would be required in order for me to change my decisions or actions?"

All of the following may be important to measure for changes over time:

- **Plant Species Composition:** This will help you understand whether the plants on your rangeland are desirable, productive forage plants, or undesirable, less productive and unpalatable plants. Plant species composition also gives an indication of whether weeds are becoming more prevalent. Generally speaking, improving grazing management will show an improvement in plant species within the first three years.
- **Forage Productivity:** This relates directly to how many animals can safely graze in an area, and for how long, without damaging animal health or plant vigor. Is your rangeland becoming more productive, or less productive? Will you be able to run more animals in this pasture in the future with good grazing management?
- **Ground and Canopy Cover Factors:** Ground and canopy cover are the type and amount of material that protects the soil surface from evaporation and erosion, such as growing plants, plant litter, mosses or lichens, and gravel or rock. Measuring these factors over time will provide an indication of the amount of open, bare ground that is present, and whether it is increasing or decreasing. This is very important because most rangelands are limited in the moisture they receive, and this material shields the soil surface from evaporation. These measurements will also determine if the basal area of growing plants is increasing, which is an indication of higher productivity.
- **Forage Quality and Livestock Performance:** A high level of rangeland forage quality is essential for meeting or improving animal performance goals. Monitoring changes in plant composition can give an indication of whether or not forage quality is increasing or decreasing. It will also provide information on the location and number of toxic or poisonous plants.
- **Livestock Use:** Utilization is the proportion of current-year forage production that is consumed or trampled by grazing animals. Utilization is an index of grazing impact to the land

that can help a rancher achieve his objectives. Measuring utilization of 2 to 3 key forage species each year will help you understand how your animals are grazing in an area, and how much they are consuming key plants. It will tell you if you need to move animals out of a pasture sooner, or if some areas are receiving very light grazing.

- **Wildlife Use:** Just as it is important to know how much your livestock are grazing key plants, it is also important to know how wildlife is using and impacting your forage plants. Besides looking at utilization of key plants, you should note the season of use, utilization patterns, and trends in animal populations. Wildlife may especially impact woody plants by browsing them. Monitoring photographs can be used to monitor changes in woody plant vigor and health.
- **Changes in Climate or Annual Rainfall:** Not all changes that occur on your rangelands are caused by grazing animals. Climatic shifts from dry to wet rainfall years can change the plant composition and production of the range drastically. Keeping records of annual rainfall will help you understand how climate is impacting your rangeland. It may also help you to make predictions in the future as to adjustments that may be needed for stocking rates in wet or dry years.

How Do I Get Started Developing a Monitoring Program?

- Set the overall goal (or vision) for your ranch. This should reflect your personal values, level of production, and the desired landscape description.
- Inventory the ranch to define current resource conditions and production levels. Identify problem areas and opportunities for improvements.
- The historical grazing use (recorded in a useable format) is critical to have during the planning process in order to determine cause and effects.
- Identify key areas and select locations for monitoring sites.
- Set realistic objectives that take into account the potential of each site. Clearly describe what you want each key area to look like in the future.
- Select proper monitoring techniques that will: (1) measure the necessary attributes, (2) document actual use by livestock and wildlife, (3) be simple and quick to use, (4) be replicated consistently and objectively by others, and (5) be accepted by other interested parties.
- Obtain technical assistance as needed from the Natural Resources Conservation Service, Cooperative Extension Service, State Natural Resource Agencies, Bureau of Land Management, U.S. Forest Service, or others.

- Make a commitment of your time, not only to conduct annual monitoring but also to become more knowledgeable of rangeland monitoring and its benefits.

Must Monitoring Be a Long-Term Commitment?

- Monitoring should be a part of all decision making and used to evaluate all phases of the conservation planning process.
- Monitor to make day-to-day management decisions. When should I move the yearlings into the next pasture?
- Monitor to evaluate the past grazing season and plan for the next.
- Monitor to identify long-term trend. Will the condition of my rangeland be worse, better, or the same five years from now?

What Types of Monitoring Methods Are There?

- Comparing photographs (close-up or general view) of the same area taken over a period of years documents changes in the soil and plant community.
- Vegetative data can be collected and used to detect subtle changes that occur over the long-term. Attributes that could be measured might include plant composition, canopy cover, density of noxious weeds, ground cover (i.e., bare ground, litter, living plants), etc.
- Record actual use (livestock numbers and turn-in/turn-out dates). This information is critical when trying to determine what is causing the rangeland to respond either positively or negatively.
- Grass and browse utilization levels should be monitored during the grazing season in order to make timely management decisions. Mapping the pattern of pasture utilization at the end of the growing season identifies under-used and over-used portions of the pastures.

Where on My Ranch Should I Monitor?

- It is impossible to monitor every acre. Select key areas that are representative of the pasture as a whole in terms of soils, vegetation, slope, aspect, distance to water, etc.
- You may wish to select critical areas that have exceptional values or are unusually susceptible to damage (riparian areas, areas under public scrutiny, critical wildlife habitat, etc.).
- Select areas where you would expect to see improvement fairly soon.
- Select an area in good condition to show that your new management strategy or improvement practice designed to improve the problem areas is not detrimental to other areas.

- Select comparison areas that may be lightly used or managed differently than the rest of the pasture so that yearly climate differences can be separated from management effects.
- Select areas that are easily accessible.
- Select areas away from where livestock tend to congregate (fences, salting areas, water holes, etc.).
- Monitoring techniques can be selected that are faster and easier to use if very specific objectives are set. This allows you to monitor fewer rangeland attributes and to focus on selected key plant species.
- Monitoring to make day-to-day management decisions is conducted throughout the grazing season. This may only involve making observations and notations on livestock in/out dates, rate of plant growth, degree of utilization, physical damage, etc.

How Long Does It Take to Monitor?

- One to two days a year should be set aside to conduct long-term trend monitoring on your ranch. Any more than this is too much (unless you are managing a very large operation).
- An additional day or two (depending on the size of the ranch) will be needed to map utilization levels at the end of the grazing season.
- This is where the real work begins. Set aside time to compile and interpret the information and plan for the upcoming grazing season.



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